ATTACHMENT A

Executive Summary

Feather River Aquatic Organism Passage Project
Master Challenge Cost Share Agreement
California Department of Transportation
Forest Service, Plumas National Forest

Goals and Mutual Benefits

The Forest Service has an opportunity with Fire Settlement Funds to implement Fire Restoration objectives that overlap with previous management strategies. The goal of this partnership is to improve road crossing facilities along State Route 70 for aquatic organism passage. The partnership will implement the long term goals developed during previous efforts utilizing Fire Settlement Funds from the Storrie Fire for sites on Forest Service lands and Caltrans funding for sites on non-federal lands, with, an estimated total budget of $15,000,000. Working together and pooling funding from both agencieswill provide the largest impact to improving habitat within the watershed.

Caltrans will collaborate with the Plumas National Forest to meet the aquatic organism passage objectives of both agencies while meeting their requirements toconstruct well engineered structures that will endure floods, require little maintenance, and provide for public safety and highway function. These are our mutual benefits.

For sites located on non-Forest Service lands, benefits of AOP projects to adjacent Forest Service lands will be realized. The project will need approvals through the California Department of Fish and Wildlife's Streambed Alteration Agreement Program, the Regional Water Quality Control Board's Section 401 Water Quality Certification Program and the U.S. Army Corp of Engineers Section for 4040 permitting regulations. Caltrans and U.S Forest Service will cooperate to obtain necessary state and federal permits and approvals.

The non-Forest Service landroad crossings will be Caltrans matching contribution. These crossings are in the Rock Creek reach and are fishery improvements for Little Indian Creek, Soda Creek and Rush Creek. Soda Creek is a high priority for both fisheries and amphibians. If these crossings on non-forest service lands are not improved, future efforts to improve passage on adjacent Forest Service lands will realize little if any benefit because the Highway 70 crossings serve as substantial barriers preventing movement into these tributary stream from the main stem NFFR.

Caltrans mission statement for ecological sustainability is an integral part of Caltrans goals and mission. Caltrans views this project as a unique opportunity to partner with the Forest Service to the benefit of the highway system and the ecological environment. Guiding principles of the California Department of Fish and Wildlife's California Salmonid Stream Habitat Restoration Manual and U.S. Forest Service Aquatic Organism passage design criteria will be used by Caltrans to improve stream crossings. These design requirements will benefit local trout populations by providing passage to valuable upstream habitats, and benefit other aquatic organisms within Forest Service lands by providing natural stream conditions and improved migration or passage. The goals of Fish and Game Code Section 1602 which was amended by California State Senate Bill 857 for anadromous fish requiring unimpeded access to streams for aquatic species on California state roads which Caltrans manages and setting goals for inland fisheries. The projects will contribute significantly to Forest Service objectives for aquatic organism passage and stream habitat improvement in the NFFR.

Background

State Route 70 traverses along the Feather River Canyon which was formed by the North Fork of the Feather River. As the road progresses westward from Quincy, California, State Route 70 crosses numerous tributaries of the North Fork of the Feather River. Many of the crossings were constructed over twenty years ago and are barriers to aquatic

organisms due to being a physical barrier, a water velocity barrier or having no natural roughness. As State Route 70 progresses west it parallels the North Fork of the Feather River. Numerous collaborative resource management efforts occurred in the late 1990's that resulted in Memoranda of Understanding and a Letter of Intent for an Aquatic Organism Management Plan for the North Fork of the Feather River (NFFR) watershed. The tributaries to the North Fork of the Feather River are the focus of this project for fish and amphibians as they provide cold water refugia, cover from predators, resting pools, spawning habitat, dispersal habitat, and rearing habitat.

The Foothill Yellow Legged frog (FYLF) spends 90 percent of its lifespan in the tributaries of the North Fork of the Feather River.The FYLF migrate down to the North Fork of the Feather River to breed, spending less than a month in the NFFR. They move back into the tributaries swiftly due to predation and better habitat for cover. The early management efforts identified important tributaries to the Foothill Yellow Legged frog. These efforts also determined that the fish spawning and rearing habitat is on Forest Service lands, so efforts to improve habitat should be addressed at a watershed level.

Caltrans manages State Route 70 and has a right of away and an easement across Forest Service lands. They are responsible for maintaining the roadway and facilities such as bridges, arches and culverts. Caltrans also has an interest in improving aquatic organism passage along Highway 70, which is the impetus for their participation in this project. This project will require the roadway and pavement to be demolished during the process of reconstruction of the improved crossing and then replaced to meet structural and safety requirements.
Caltrans and Forest Service participated in the development of the management plan for the NFFR. The NFFR Rock Cresta reach was determined to be important habitat for the Foothill Yellow Legged frog, a Forest Service Sensitive species. The Grizzly, Heinze, Bear Ranch and a no name tributary at mile post 42.87 have been identified as key tributaries which have barriers to either fish or amphibians.

The Poe reach of the NFFR has important habitat for fish and or amphibians at Mill Creek and Four Trees and a no name tributary at mile post 41.42. The amphibians are not doing well in this reach which is the lowest reach of NFFR. If the Foothill Yellow-legged Frog does not have a way to traverse up the creek to get back up into the tributary the frogs will cross the road. Individual frogs of a struggling population are lost due to being struck by vehicles.

The North Fork of the Feather River and many of the tributaries are located in part within the perimeter of the Storrie h wildfire.Areas on Forest Service lands within or adjacent to the Storrie Fire perimeter have Fire Restoration funding available for restoration activities. The Plumas National Forest has been tasked with restoring and enhancing habitat which was lost due to the wildfires. A project proposal was submitted for review and approval by the Regional Ecosystem Management Team, see attachment A, Project Proposal. It was approved as it was determined the tributaries selected met the high priority criteria and were affected by the loss of vegetation and exposed soils due to the wildfire.

Effects of the Storrie Wildfire on the Watershed

The Storrie fire resulted in high to moderate severity wildfire that exposed soils and increased erosion occurred in both the uplands and in the channels. Post fire erosion modeling by the BAER team hydrologist and soil scientists found the erosion potential of 970 tons per acre and a sediment potential of 9 cubic yards per square mile based on a 2 year storm interval (BAER Report_2500-8, 2000).

This erosion can cause down cutting of stream channels can lower water tables in adjacent floodplain, aquifers and result in drying meadows and mortality of riparian vegetation. The lack of vegetative cover from the fire increased hillside runoff and removed channel vegetation. Studies have shown that the combination of wildfire removing riparian cover and channel reorganization can elevate stream temperatures for at least a decade (Dunhan et al 2007). The responses to key factors of riverine habitats such as spawning, holding, and rearing habitat including spawning gravels, pool depth, hiding cover, and thermal refugia would be affected by wildfire. As shown in numerous studies (included in Roby and Azuma 1995, and in Minshall 2003), it is expected that stream temperatures, stream flows and nutrient levels have all increase in the short term, and that long term increase in sediment production and

deposition will occur. Partial recovery of these systems will occur quickly (1-5 years), species diversity will be higher than pre-fire but species richness would be lower, and long term recovery of the macro-invertebrate community may take 10-50+ years.

The effects of the Storrie Fire exacerbated pre-existing issues affecting aquatic species in the NFFR, such as habitat fragmentation (including barriers imposed by Highway 70), high temperatures, hydropower water releases (which can destroy amphibian egg masses), mining, and non-native predators.

This project proposes to provide connectivity to refugia habitat within and immediately adjacent to the Storrie Fire perimeter. Improving aquatic organism passage (AOP) will provide access to cold water refugia from the existing main stem of the NFFR and aquatic connectivity within the fire boundary. Upstream and downstream connectivity from within the fire boundary will allow access of meta-populations within the stream network to high quality spawning and holding habitat, thermal refugia, and to provide recruitment to the main-stem of the NFFR and the EBNFFR.

Crossings throughout the Feather River Canyon were reviewed and prioritized.

Affected species and habitat conditions:

Fisheries:

- Fish species within the NFFR primarily consist of rainbow trout, brown trout, Sacramento sucker, Sacramento pike minnow, Forest Sensitive hardhead minnow, riffle sculpin, and small mouth bass. Tributary species consist of primarily rainbow trout (stocked and wild strains), riffle sculpin speckled dace, and non-native brown trout with a potential for native Sacramento suckers and Sacramento pike minnow. Herpetofauna species are the Forest sensitive Foothill yellow-legged frog, pacific tree frogs (Management Indicator Species – MIS) and potentially the Forest Sensitive Western pond-turtle. Additional aquatic species that occur are macro-invertebrates, and other invertebrates such as mussels and clams.
- Spawning habitat is severely lacking in the Cresta and Rock Creek reaches of the NFFR (.07-.13%) due to hydropower operations and therefor dependent on recruitment of wild trout from tributary spawning and nursery areas.
- The North Fork Feather River is on the 2010 303(d) as an impaired water body for water temperature impairments and polychlorinated biphenyl [PCB] (CWRQCB 2010). The EBNFFR is not listed but also has water temperature impairment. Improving AOP will provide access to cold water refugia from the main stem of the NFFR and provide the movement of aquatic species up into the watersheds.
- Access to tributaries has been reduced due to aquatic fragmentation caused by the highway, railroad, and hydroelectric dams & penstocks throughout the Feather River canyon.

Amphibians:

- Amphibian species in the NFFR and EBNFFR are FYLF, Pacific tree frogs, and the California Newt. FYLF are currently only known to occur in the Cresta Reach.
- Again, access to tributaries has been reduced due to aquatic fragmentation caused by the highway, railroad, and hydroelectric dams throughout the Feather River canyon.
- In regulated streams, water released from reservoirs wash away eggs and tadpoles and force adult frogs away from the streams leaving them more vulnerable to predators. Recreational activities along streams that alter streambeds, especially gold mining are having a negative impact on frog populations in the Sierra foothills. Introduced fish stress frog populations by consuming eggs and tadpoles, and introduced bullfrogs compete for food and eat the FYLFs. Habitat loss, disease, introduced crayfish, stream alteration from dams, mining, logging, and grazing, are also threats to this frog (California Herps 2013).

Target species for AOP improvements are rainbow trout (stocked and "wild"), brown trout (non-native desired species) (PLRMP, 1988), Foothill yellow-legged frogs and other amphibians).

Life History and Ecology:

Rainbow Trout (Oncorhynchus mykiss)

Prime habitat conditions for inland rainbow trout are clear, clean and cold headwaters, creeks, small to large rivers & cool lakes. "Good trout stream habitat is complex, consisting of an array of riffles and pools, submerged wood, boulders, undercut banks, and aquatic vegetation. The ability to swim to and from different habitats from tributary confluence to headwaters, increases the value of individual habitat components. Assuring fish passage through artificial barriers in a system of connected habitats greatly enhances the capability of an aquatic system to sustain rainbow trout populations" (NRCS, 2000). Rainbow trout are opportunistic feeders that rely on a wide variety of food items ranging from small insects, aquatic macro-invertebrates to crayfish.

Literature has shown that cold water fish bearing streams range from 2-10% with potential habitat in high gradient reaches (up to 20%) without barriers. Accessibility to salmonids depends on hydrology, water year and stream morphology.

Rainbow trout are both wild strains from historic steelhead runs and stocked and considered introduced.

Foothill yellow legged frogs (*Rana boylii*), Forest Sensitive Species

On the North Fork Feather River (NFFR), adult frogs are typically found on the main stem of the river only during the breeding season (March to June), after high flows have receded, in shallow and slow flowing water with at least some pebble and cobble substrate (Lind 1990). Frogs usually move into shaded tributaries to the NFFR during mid-summer, remaining in tributaries until the following spring (GANDA 2005).

Currently there are only FYLF found in the Cresta reach of the NFFR. The current population within the NFFR is very low primarily due to the regulated stream, recreation boating releases, and inaccessibility to the tributaries in which adult and juvenile FYLF spend 90% (Non-breeding habitat).

The primary objective of AOP remediation in the Crest Reach is to provide aquatic connectivity to FYLF adults and juveniles from the main stem breeding habitat in which they spend approximately 10 – 30% of their life to the very important the tributaries which they spend 70-90% of their life cycle. An example of the importance of AOP is described in the following article as summarized: In 2012 the Ecological Resource Committee found a vehicle-killed FYLF at an AOP crossing on State Route 70 near Shady Rest . Assessment found that the culvert was perched and to remedy the problem, 4 cubic yards of cobbles & boulders were placed to fill the 3 foot void below the culvert. The article further explained that these frogs utilize these crossings at different times of the year with adult frogs migrate from the tributaries to the main stem river for breeding in the spring and heading back up the tributaries after breeding to spend the summer in their cool shaded waters, instead of the sunny open river banks in the NFFR. Once tadpoles metamorphose into frogs at the end of the summer, they spend some time on the river, eating and growing. In early fall the young then also migrate back up the tributaries to overwinter out of harm's way, as the main stem river will see much higher flows during the winter (PGE, YubaNet.com 2012).

Ecological Benefits:

The primary ecological benefit of AOP passage improvements on both FS and non- Forest Service lands (Cal Trans Funded) is providing Salmonids access to cold water refugia, spawning, rearing and holding habitat. The main stem of the NFFR and EBNFFR has a predatory fish assemblage consisting of native Sacramento pike minnow, small mouth native and non-native predatory bass. These non-game fish species primarily prefer warmer waters. By providing access to the cold water tributaries, salmonids have refuge from the native predatory fish species and the seasonally lethal temperatures that occur in the NFFR. The primary ecological benefit of the proposed AOP improvements for adult and juvenile foothill yellow legged frogs,and other amphibians, is to provide access to the tributary streams in which they have more protection from predators such as crayfish and predatory fish species and effects of pulse flows due to hydropower stream regulation, in addition to increased cover and shade.

Criteria used to assess habitat opened up by AOP improvements:

FYLF: There are no known studies that have identified gradient as a barrier to FYLF unless a velocity barrier within an AOP or a perched culvert in which frogs cannot climb into (A.Lind, pers. comm 2015). In the tributaries there is potentially suitable habitat in all perennial and intermittent stream gradients.

Salmonids: Literature has shown that rainbow trout range in gradients from + or - 2% to less than 10% depending on the morphology and hydrology of the stream. Region 5 Fisheries Program Leader Michael Kellet (USDA, 2013) has advised Forest biologists to derive the miles of stream habitat enhanced above a remediated barrier based on GIS analysis that includes NHD, stream gradient, fish distribution, and barrier data. Typically the reported miles include all upstream fish-bearing and potentially fish-bearing perennial stream miles that are below all known barriers and/or persistent 20% gradient.

Sites selected for AOP improvements:

The Forest Service evaluated 30 crossings and focused on highest priorities to improve habitat for both fish and amphibians. These crossings have been determined to be important for both Forest Service and Caltrans aquatic habitat improvement goals and objectives. The connectivity of streams to allow fisheries and aquatic species to move upstream or downstream is important to the State of California, Caltrans and the Forest Service as it provides fisheries and aquatic species the ability to access cold water refugia, slower moving waters for resting, good spawning gravels, and avoidance of non-native predators.
The watershed approach will open more habitats onto Forest Service lands including benefits generated from improved crossings on adjacent non-Forest Service lands.

Lower Mill Creek

Note: Propose to build a bridge which will also provide safe crossing for terrestrial species. Known historic habitat for steelhead and chinook salmon (pers. commM.Kossow, 2015).

- **Ecological Benefits:**
  - Provides thermal refugia to salmonids and other aquatic species.
  - Provides access to adult and juvenile FYLF non-breeding habitat.
  - Provides a safe migration route for terrestrial wildlife species.
- **Affected Species:**
  - FYLF and other amphibians, salmonids, terrestrial wildlife species (mink, ringtaileds, river otters, potentially deer, and other mammals).

- **Distance provided for each species**

Salmonids:

  - Lower Mill Creek is a moderate to high gradient transport stream (2-10% gradient with short cascades of 10-20% gradient. By providing AOP at State Route 70 there is salmonid access to one very large deep pool for thermal refugia and approximately .62 miles (1000 feet) of habitat. With upstream passage improvements it is projected that up to 1.5-3.5 miles of habitat may be accessible to adult rainbow trout during higher flows for spawning, rearing and holding during the springs and early summer.

Foothill yellow legged frogs

  - Non-breeding season habitat (Juvenvile and Adult FYLF's): approximately 5 miles to headwaters of Mill Creek, and an additional 3 miles up the South Branch of Mill Creek (total approximately8 miles)

Bear Ranch Creek

Note: Primary objective is for amphibian passage and potentially terrestrial wildlife passage. The existing undersized encased steel stringerbridge could be retained for terrestrial passage.

- **Ecological Benefits:**

- Provide thermal refugia to salmonids and other aquatic species, access to adult and juvenile FYLF non-breeding habitat. There is a potential to keep the existing structure for terrestrial species passage and construct a bridge adjacent to it for aquatic passage.

- **Affected Species:**
  - FYLF, Rainbow trout, and benefit to terrestrial species

- **Distance provided for each species**
  Salmonids: 300'of pool/riffle habitat, spawning, rearing, holding, and thermal refugia.

  FYLF: Non-breeding season habitat (Juvenvile and Adult FYLF's): approximately 5 miles

Grizzly Creek

Note: location where California Newts migrate across roadway, and within the Cresta reach with a known FYLF population. AOP is passable to fish and the proposal is to construct an amphibian ramp/pathway on side of rock tunnel under highway to provide access tributary from the mainstem. Historic habitat for Steelhead and Chinook Salmon (pers. Comm.M.Kossow, 2015).

- **Ecological Benefits:**
  - Access to adult and juvenile FYLF non-breeding habitat and a safe migration route for California Newts.
- **Affected Species:**
  - FYLF & California Newts

- **Distance provided for each species**
  Salmonids: not currently a barrier.

  - Grizzly Creek is high gradient (average 4.5% in the upper 1.5 mi and 7.5% in the lower 6 mi) and moderately shaded throughout this length (PG&E, 2014).
  - A series of high gradient habitats located about 1,000 meters (.62 miles upstream of the confluence of Grizzly Creek and the NFFR were described as complete barriers to upstream fish migration (CDFG 1988). There is a significant rainbow and brown trout population that migrates from Grizzly Forebay.

  Foothill yellow legged frogs:

  Note: Very deep pool with medium to high velocities. It is believe that amphibians cannot survive passage with fish in this pool (A.Lind pers. comm. 2014).

  - Non-breeding season habitat (Juvenvile and Adult FYLF's): approximately 8 miles to Grizzly forebay, and then 1 mile within the forebay, and an additional 5 miles to the headwaters (total approximately 14 miles)

Cal Trans Easement/non-Forest Service land AOP's

Little Indian Creek

- **Ecological Benefits:**
  - access to spawning habitat and cold water refugia for salmonids, and access to adult and juvenile amphibian non-breeding habitat on Forest Service lands.
- **Affected Species:**
  - Rainbow trout and FYLF.

- **Distance provided for each species**

Salmonids:

- Spawning/Rearing: access to approximately .62 miles to a barrier or high gradient cascade. With potential improvement there may be access to 2-3 miles of habitat.
- Thermal Refugia**:** .62 miles (3,280 feet).

Foothill yellow legged frogs:

- Non-breeding season habitat (Juvenvile and Adult FYLF's): 4-5 miles

Rush Creek

- **Ecological Benefits:**
  - access to spawning habitat and cold water refugia for salmonids, and access to adult and juvenile amphibian non-breeding habitat on Forest Service lands.
- **Affected Species:**
  - Rainbow trout, FYLF, and potentially SNYLF

- **Distance provided for each species**
  Salmonids:

  - Spawning/Rearing: access to approximately 1.25 miles to a high gradient cascade. Thermal Refugia**:** 1.25 miles

  Foothill yellow legged frogs:
  - Non-breeding season habitat (Juvenvile and Adult FYLF's and potentially SNYLF's): approximately10 miles

Soda Creek

- **Ecological Benefits:**
  - access to spawning habitat and cold water refugia for salmonids, and access to adult and juvenile amphibian non-breeding habitat on Forest Service lands.
- **Affected Species:**
  - Rainbow trout, FYLF, and potentially SNYLF
- **Distance provided for each species**
  Salmonids:

  - Spawning/Rearing: access to approximately .2 miles to A perched culvert on FS land. With AOP remediation on FS land, there may be access to 2-4 miles of habitat
  - Thermal Refugia: .2 miles (2-4 miles with AOP improvement on FS land).

  Foothill yellow legged frogs:
  - Non-breeding season habitat (Juvenvile and Adult FYLF's**): 4-5 miles**

Overview of Roles and Responsibilities

Caltrans will conduct the NEPA and CEQA analysis and reporting; the Plumas National Forest will provide the review of reports for NEPA sufficiency and write the decision for the NEPA document. Caltrans will prepare and sign the CEQA decision. Caltrans will develop the design and Plumas National Forest will review and if needed both agencies will collaborate on the design to meet objectives. National Fisheries Cadre will assist the Plumas National Forest in collaborating with Caltrans on the design.

Caltrans will develop, award and administer the contracts and the Plumas National Forest will provide on-site technical advice to Caltrans Lead Engineer.ThePlumas National Forest will develop and implement the monitoring plan, and share the information obtained with Caltrans.

Caltrans will be responsible for every aspect of the work on non-Forest Service lands as their contribution to the Challenge Cost Share Agreement.

The partners will enter into a Master Challenge Cost Share Agreement and Supplemental Project Agreements will be created for each phase of the project. The project has three phases; planning, design and contract development and construction. The project will be complete five years from the signature of the agreement.

Conclusion

This collaborative effort to work together at designing aquatic organism passage along State Route 70 is a partnership that can address large scale habitat restoration. By working jointly on this project each agency's goals are amplified. It can be a model for future partnerships.